New Booster Corrector Magnet

Power Amp Controller

Draft Request for Comment

June 15, 2005

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General Specification

We are planning to install 48 new corrector magnet packages into the Booster in the Fall of 2007. Each of these packages contains 6 magnets, for a total of 288 magnets and associated power amplifiers. We are requesting new electronics to provide the magnet ramp curve voltages that ramp the current out of the power amplifiers through the Booster cycle. Each new controller should support the following functions for each magnet.

1. Provide an ACNET programmable DAC ramp voltage output with the following parameters.
    a. +/- 10V output into >20K Ohms.
    b. 10 k updates per second.
    c. At least 400 points per curve.
    d. At least 10 different curves for use with different Booster modes.
    e. 16 Bit nominal DAC resolution.

2. Provide an ACNET readable array of at least 400 points of analog, power amplifier, current monitor values.
    a. +/- 10V input.
    b. 10 k updates per second.
    c. 16 Bit nominal ADC resolution.

3. Provide a function to compare the desired current setting determined by the DAC ramp values with the current monitor read back to determine if the power amplifier is sufficiently tracking the desired ramp. A status back to ACNET will indicate whether the power amplifier is tracking.

4. Besides the programmable table of ramp values, a separate DC current bias value will be settable in ACNET that will eventually be summed with the ramp values.

5. Provide four digital outputs capable of driving a TTL level at >40mA for use as the power amplifier ACNET Enable/Inhibit.

6. Four digital logic interlock inputs should be available on the module to be summed with the results of the amplifier tracking comparison (Item 3.) that can inhibit the output of power amplifier. These inputs will be derived from temperature threshold comparisons, power amplifier failure indications, door interlocks, flow switches, etc.

7. Provide for read back to ACNET of eight status bits (TTL at < 10 mA source current) for each power amplifier.

8. Provide the ability in ACNET to load ramp curves from an ASCII text file.

9. For the sake of 15 Hz Booster operation, processing time available between the playing of the ramps is 20 ms.

10. The space available for the electronics is equivalent to one CAMAC crate or one 6U VME crate for each set of 48 power amplifier controllers.

Draft Project Schedule for the Corrector Controllers

Please check and comment on the choice of tasks, the number of man-hours (Work), the Start date, and the percent of availability that the Resource would actually be applying to the task. This last item will impact the actual Duration of the task and does help make the task duration more realistic. It is rare that anyone at Fermilab gets to focus 100% on anything at any particular time.

	Task Name	Work	Duration	Start	Finish	M&S	Resource Names	Predecessors
14								
15	**CAMAC Corrector Controller, CC**	**1,904 hrs**	**133 days**	**Mon 8/1/05**	**Wed 2/1/06**	**$0.00**		
16	CC: Specification	16 hrs	2 days	Mon 8/1/05	Tue 8/2/05	$0.00	AD Electrical Engineer	
17	CC: Prototype Schematic Layout	40 hrs	5 days	Wed 8/3/05	Tue 8/9/05	$0.00	AD Electrical Engineer	16
18	CC: Prototype Parts Procurement	240 hrs	30 days	Wed 8/10/05	Tue 9/20/05	$4,000.00	vendor	17
19	CC: Prototype PCB Layout	160 hrs	20 days	Wed 8/10/05	Tue 9/6/05	$0.00	AD Drafter/Designer	17
20	CC: Prototype PCB Fabrication	120 hrs	15 days	Wed 9/7/05	Tue 9/27/05	$3,000.00	vendor	19
21	CC: Prototype Assembly, 5 Units	24 hrs	3 days	Wed 9/28/05	Fri 9/30/05	$0.00	PPD Electrical Technician	18,20
22	CC: Prototype Testing	80 hrs	10 days	Mon 10/3/05	Fri 10/14/05	$0.00	AD Electrical Engineer	21
23	CC: Prototype Approval	8 hrs	1 day	Mon 10/17/05	Mon 10/17/05	$0.00	AD Electrical Engineer	22
24	CC: Production Schematic Revisions	16 hrs	2 days	Tue 10/18/05	Wed 10/19/05	$0.00	AD Electrical Engineer	23
25	CC: Production Parts Procurement, 80 Units	240 hrs	30 days	Thu 10/20/05	Wed 11/30/05	$48,000.00	vendor	24
26	CC: Production PCB Layout	80 hrs	10 days	Thu 10/20/05	Wed 11/2/05	$0.00	AD Drafter/Designer	24
27	CC: Production PCB Fabrication, 80 Units	160 hrs	20 days	Thu 11/3/05	Wed 11/30/05	$28,000.00	vendor	26
28	CC: Production Assembly, 80 Units	320 hrs	40 days	Thu 12/1/05	Wed 1/25/06	$0.00	PPD Electrical Technician	25,27
29	CC: Teststand Assembly	80 hrs	10 days	Tue 10/18/05	Mon 10/31/05	$5,000.00	AD Electrical Technician	23
30	CC: Production Testing	320 hrs	40 days	Thu 12/8/05	Wed 2/1/06	$0.00	AD Electrical Technician	28SS+5 days,29